



NEWS RELEASE

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Address
by
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Rarely, except in time of war, has an undertaking of our federal government been accorded public attention equal to that of the nation's current efforts in space.

That this attention has not produced a comparable degree of public understanding of our space objectives is, perhaps, a shortcoming inherent in an effort of this magnitude. Any program so vast and so complex must, almost inevitably, be oversimplified if it is to be discussed at all.

Thus, those of us who seek to develop a broad public understanding of space goals find ourselves in the frustrating position of having to deal with a subject which must be reduced to simple or general terms if it is to be understood, but which, if oversimplified, may be even less adequately understood.

Since my purpose this evening is to attempt to place our space program in perspective, these preliminary remarks may suggest that I have displayed more courage than judgment in coming here at all. I hope that this will not prove to be the case.

The necessity for generalization in discussing the technical aspects of the space program is obvious. The details are many and involved, and their comprehension requires a broad understanding of science and technology, and the time and motivation to study the program in depth.

The difficulty, if not impossibility, of communicating elaborate technical details, is not a matter of serious concern. The inner workings of a television set need not be understood in order that it be appreciated.

What is of great concern, however, is the fact that the habit of oversimplifying has carried over into the evaluation and understanding of our objectives in space. It is imperative, particularly in view of the national resources being committed to the pursuit of those objectives, that they be fully appreciated by those who are paying the bills.

It is this task to which I propose to address myself tonight, and I hope that what I have to say will enhance the understanding not only of this audience, but of other Americans, as well.

President Kennedy, when he first proposed the accelerated space program which is now underway, included as a goal the landing of an exploratory team on the Moon, and returning it safely to earth, within this decade.

More recently he has said, "We choose to go to the moon in this decade, and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energy and skills."

In discussing the lunar goal, the President has made it abundantly clear that it is not so much an end in itself, as it is a challenging focal point for the initial stages of an enormous national effort. Yet, there is ample evidence that many of our citizens believe our major, and in some cases, our only purpose in space to be one of winning, in a contest with the Soviet Union, "A race to the moon."

There is some temptation to let this concept stand. It has the virtue of being simple and readily understood; of implying the need to meet a challenge to our position as leader of the Free World, and to our own security; and of stating a goal which is alluring, even though its benefits may seem somewhat illusory.

The temptation passes quickly, however, because this statement of purpose has one grave defect. It does absolutely nothing to enlighten anyone with respect to what our space program is really all about.

It overlooks the significant, and seldom appreciated, fact that learning how to get to the moon, developing the technology which will be required to get there, and employing this technology for many purposes in space, is more important than the lunar landing itself.

Moreover, this misconception -- this understatement of our many purposes in space research and development, and the associated rewards for mankind -- itself contributes to further misunderstandings.

It leads, for example, to the examination of each new achievement in space, on the part of either nation, in a misguided effort to estimate which is now "first," and which is "winning the race." On the basis of a single event, one or the other of the nations involved is assumed to have gained or lost position in the "race."

Characterization of our effort solely as a "space race to the moon" also leads to the mistaken notion that the nation first to conduct a lunar exploration will have assured itself of ultimate and enduring superiority in space. The fact is overlooked that landing men on the moon, although a great and challenging goal, is only one of many goals in space.

Those who occupy authoritative positions associated with our space activity face still another hazard. This is the fact that any effort to place particular national space accomplishments in perspective invariably leads to the conclusion, on the part of some, that we are minimizing Soviet achievements and exaggerating our own.

The recent synchronized launching of two men by the Soviet Union with their consequent near approach in space, produced many uninformed interpretations which sought to give the feat meaning which it actually did not merit, in relation to long-term space objectives, particularly "the race to the moon." But when responsible authorities in our own government, including myself, waited for the facts to come in and then endeavored to appraise this feat objectively -- to view it in terms of the significance which it actually possessed -- it was widely reported that we did not fully appreciate the Soviet capability in space, or worse, that we sought to conceal its significance from the American people.

I know of no responsible official in this country who has attempted to minimize Soviet capabilities. In manned space flight we have been behind, we are behind, and we will remain behind for some time. President Kennedy has repeatedly emphasized this as a fact

that we face, and as a reason for his actions to speed up our own efforts.

I have said repeatedly, as have others, that they have demonstrated a very real technological capacity; an ability to plan and engineer and build and fly vehicles which cannot be ignored in considering their potential for further achievements in space.

Nor would I stop there in giving them their due. Utilizing the superior rocket thrust which they are known to possess, and the technological skill which they have already displayed, it would be folly not to expect that they will demonstrate even greater skills.

Specifically, a rapid development of advanced specialized spacecraft within their known booster capacity would give them the opportunity to rendezvous and join spacecraft in earth orbit before we are able to perform this feat. A year ago I stated they may even conduct a manned circumlunar flight before we are able to do so. These would be significant achievements whose importance should not be underestimated.

Meanwhile, however, evaluation of such milestones in relation to our own efforts, should not be hasty or ill-considered.

These events, when and if they occur, will not dictate that we should revamp our own program. They will tell us little, if anything that was not considered in establishing the accelerated space program which we now have underway; a program which was conceived to assure us of pre-eminence in space. However, there are events which, if they occurred, would make it necessary for us to reassess our own effort. The unveiling, in the near future, of a launch vehicle with substantially greater thrust than that which the Soviet Union has previously displayed -- something on the order of our Advanced Saturn C-5 -- would obviously be one of these.

I sometimes find it difficult to understand, in a nation which has repeatedly demonstrated its capacity to achieve supremacy in any technological effort, when it is determined to do so, why expressions of confidence in our ability to lead in space should be greeted with doubt, disbelief, or suspicion.

With the resources which are being applied, and knowledge of how those resources are being utilized to mobilize our nation's scientific, technical and industrial strength, I am confident that we will achieve a space posture satisfactory to the United States given a continuation of our present efforts and support for those

planned for future years. On the basis of what we know now of the scope of the Soviet Union's efforts, and of which is required to do the job, this country has a better than even chance to conduct the first manned exploration of the moon. For these reasons, I have said I believe we will be there first.

But in saying this I do not want to fall into the same trap which has snared too many of us -- that of again inviting a characterization of this broad and vital national effort as a spectacular "race to the moon."

If I can leave anything in your minds as you go home tonight, I hope it will be this -- a basis for a broader understanding of our total goals in space.

As the foundation for a discussion of those goals I would like to quote briefly from the remarks of President Kennedy, made last month in Houston Texas, during a tour of some of our major space facilities. The President said, in part:

"Those who came before us made certain that this country rode the first waves of the industrial revolutions, the first waves of modern inventions, and the first wave of nuclear power.

"Our leadership in science and in industry, our hope for peace and security, our obligations to ourselves as well as to others, all require us to make this effort, to solve these mysteries, to solve them for the good of all men, and to become the world's leading spacefaring nation.

"We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own.

"Whether it will become a force for good or ill depends on men, and only if the United States occupies a position of pre-eminence can we help decide whether this new ocean will be a sea of peace, or a new, terrifying theater of war."

This eloquent statement deserves close scrutiny, not only in terms of what was said, but also of what was not said.

The President did not say that our national goal is that of landing the first man on the moon, or, for that matter of being "first" with respect to any single achievement in space. We have done many things first, and we will do many other things first. But this is not the objective which the President stated.

Rather, he stated our determination to attain "a position of pre-eminence in space" and to "become the world's leading space-faring nation."

It is essential that this distinction be clearly understood. The mastery of space, and its utilization for the benefit of mankind, will not be determined by any single achievement. It will be determined by the accumulation of all the scientific knowledge, all of the technology, all of the experience, all of the space launch and terminal facilities where space missions can begin and terminate, and all of the aids to space navigation required for safety and regular service. There are resources to permit man to operate in space as he has learned to operate on the land, sea, and in the air.

No single display of technological skill, however dramatic, and whether it be our own or that of the Soviet Union, is a valid basis for predicting, in the infancy of space exploration, which nation will achieve ultimate superiority. At the same time, each new demonstration of progress is a clear sign that the problems ahead are fewer than they were.

Early development of more powerful rockets has given the Soviet Union a temporary superiority in the ability to launch large spacecraft. These rockets have been used many times, and are highly reliable. For the present, this enables them to do things we cannot do.

Similarly, our recent mid-course correction of the Mariner spacecraft en route to Venus was a demonstration of guidance accuracy and control which the Soviet Union has yet to match, and one essential to advanced exploration in space.

Yet neither of these facts, of itself, establishes either nation as the one most likely to achieve a sustained position of material advantage.

I am convinced, as are others responsible for the United States space program, that it is a foundation for our nation's space power, for what the President has called -- "pre-eminence in space." But, I emphasize again, pre-eminence does not signify success in achieving a single goal, even one so advanced as reaching the moon.

All of us are familiar with seapower, particularly here in New England, and with the importance it has held for mankind in both civilian and military applications. At one stage in our history, our seafaring capabilities were extended in countless shipyards producing fast, small vessels all along the New England

coast. Today seapower finds essential men with the brains and tools and factories and shipyards to turn out and operate nuclear submarines and many other vessels of vast range.

No nation has mastered the seas, nor developed the capacity to employ sea transportation for its own benefit, overnight. This stature came only as the result of great efforts over long periods of time, involving many men, many minds, many skills, vast resources and great costs.

Behind the voyage of Christopher Columbus was a long period of effort in naval architecture, and the development of the skills required to construct an adequate ship. Shipyards were required to build it. A shakedown cruise was required to perfect it and to train the crew. And knowledge was required of navigation and of weather, to enable the mission to succeed.

In our space effort, similar steps must also be successfully undertaken before we can carry out successful missions to the far more distant horizons of space through an infinitely more hostile environment. The use of science to advance technology permits all of this activity to be severely compressed in a short span of time, but the state of the art must be pushed to the limit in many fields. This is the process in which we are now engaged, in a fast-paced, prudently managed, but driving effort.

At 17 NASA field installations, and thousands of research facilities and industrial plants throughout the country, work is going forward to design, develop and produce a family of launch vehicles and spacecraft essential to all of our future missions in space. These, essentially, are the shipyards of the space age.

At Huntsville, Alabama, two weeks ago, the President inspected the work in progress at NASA's Marshall Space Flight Center on two launch vehicle projects -- the Saturn C-1 and the Advanced Saturn C-5 -- which will provide this country with very great power to lift objects in space.

The Saturn C-1 will begin carrying useful payloads next year, and will have a reliable and proven capacity to lift as much as 20,000 pounds into earth orbit. By 1964, we will have solved enough of the technical problems to use it to boost men into space. Its capability is equal to the combined weight which the Soviet Union announced for Vostoks III and IV, which had to be launched one at a time, and exceeds the 14,000-pound weight of the spacecraft in one of their unsuccessful Venus shots.

The first stage of the Saturn C-1, a cluster of eight engines, will generate a thrust of one and one-half million pounds. This

first stage has already undergone two successful flight tests, and a third flight is currently scheduled for November. The President also viewed a captive firing of the fourth Saturn, which is scheduled for flight test next spring.

Experience shows that at least ten test flights are necessary to prove out a new design for a complex booster. Therefore, each of the first four Saturn test flights are of the first stage only. The second stage is a water-filled dummy. Later next year, flights will begin with a live second stage, a cluster of six liquid hydrogen fueled engines. They were originally developed for the Centaur booster, which illustrates how an advanced engine can provide power for more than one booster, and becomes available for many uses.

Under the present schedule, Saturns 5 and 6 will carry early structural versions of the three-man Apollo spacecraft. Saturns 7 and 8 will carry more fully developed Apollo spacecraft into orbit for re-entry tests. The first manned flight of the Apollo in earth orbit is planned for 1964.

The six liquid hydrogen engines of the second stage of Saturn C-1 will generate a total thrust of 90,000 pounds. Since 1960, NASA has had under development a more powerful liquid hydrogen engine, the J-2, which will produce 200,000 pounds of thrust. A single J-2 engine will be employed in an improved second stage for the Saturn C-1, which will go into service about 1965. The uprated Saturn C-1, called Saturn C-1B, will lift about 28,000 pounds into earth orbit.

At Cape Canaveral, the President viewed the facilities for launching the Saturn C-1. One launch complex is already in service, and a second in advanced stages of construction.

Research, development and fabrication of the first stage of the Saturn C-1 are presently being performed in government facilities at the Marshall Space Flight Center. This is now being shifted to a contract basis, with the work to be done at the Michoud Operations Plant, a large facility near New Orleans transferred to NASA last year by the Department of the Army. All of the work on the second stage is performed under contract.

Across the Mississippi River, 35 miles from Michoud, in the southwestern part of Mississippi, NASA is establishing a site for

the ground testing of the large Saturn launch vehicle stages. Until this construction is completed, ground tests will be made at Huntsville. The noise from these tests is so great and so destructive that a large, buffer zone is necessary.

At Houston, we have established a new Manned Spacecraft Center to direct the research and development of the larger spacecraft which will follow the one-man Mercury. These include the two-man Gemini and the three-man Apollo. The spacecraft for each of these projects is manufactured under contract at sites throughout the nation. Literally thousands of industrial contractors and subcontractors are at work producing the array of systems and subsystems which are required.

This compact and highly specialized complex of government installations -- at Houston, New Orleans, southwest Mississippi, Huntsville and Cape Canaveral -- located in a region where year-round work on very large structures can proceed out-of-doors, at sites linked by water transportation, provides the central direction and capability through which industry can take on through contracts the large amount of work it must perform. Ninety per cent of NASA's dollar feed out to industry through contracts.

The largest launch vehicle under development in the United States is the Advanced Saturn, sometimes called the Saturn C-5. At Huntsville, the President inspected an F-1 rocket engine which will generate as much thrust as all eight engines of the Saturn C-1. The Advanced Saturn will have a first stage consisting of five F-1 engines, with total thrust of seven and a half million pounds. Its second stage will be five liquid hydrogen J-2 engines, with a million pounds of total thrust. The third stage will be a single J-2, as in the second stage of the Saturn C-1B.

The Advanced Saturn -- a rocket almost as tall as the Capitol building in Washington -- will provide the power to lift 220,000 pounds into orbit around the earth, or to accelerate 90,000 pounds sufficiently to overcome the earth's gravity and fly out to explore the solar system. Its first flight test is scheduled for 1965, and it will go into service about one year later.

It is this rocket which will supply the propulsion for our first manned exploration of the moon.

The activities which I have discussed constitute very rapid progress in launch vehicle development. Similar progress will be made in developing the family of spacecraft which will be utilized in achieving our space objectives.

As this technological development proceeds, we will be exploring space with unmanned vehicles to tell us more of the hazards which it contains, and what must be done to cope with them.

Early manned flights will provide crew training, and give us experience with extended periods of weightlessness -- expanding from a day to a week and then to two weeks or more. We will be undertaking shakedown cruises with the Gemini and Apollo spacecraft, in earth orbit, to teach us more about maneuvering in space, and develop the rendezvous technique.

Ultimately, within this decade, the sum of all this effort will give us the equipment, the knowledge and the skill to utilize space as we now utilize the seas or the air.

That is our objective -- to develop superior competence in space which will be available for any national purpose which may be required, whether it be the peaceful utilization of space for the benefit of mankind, or to keep the peace and forestall its exploitation by any nation for aggressive purposes.

Here in Connecticut, and in New England, you are already contributing in many ways toward the achievement of this objective. As our program proceeds, your science, your educational institutions and your industry will be called upon to contribute even more, and your own economy will also benefit from the contribution which you make.

The sum of your effort, and that of the other regions of our great nation, and your dedication to the attainment of a vital national goal, means that we will achieve our goals in space, and occupy a position second to none.

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